COST AND MANAGEMENT

PROFIT

Effective Administration, Organization and Management . . .

By A. M. Jenkins

Significant Areas for Cost Reduction . . .

By B. A. C. Hills

Integrated Data Processing . . .

By H. S. Brown

LOSS

Official Journal of

The Society of Industrial and Cost Accountants of Canada

Sept. 1956

Our day-to-day role is that of:—

—aiding administrators in solving specific management problems,

—devising and giving effect to better management methods, and

—providing such other advice and help as may enable busy executives to get quicker and better results than would otherwise be possible.

The general field in which we serve may be indicated by some of the areas of our activity listed below.

- BUDGETARY CONTROL AND STANDARD COSTS
- SIMPLIFIED COSTING
- INVENTORY CONTROL
- ORGANIZATION FUNCTIONS
- SALARY EVALUATION
- PAPER WORK SIMPLIFICATION
- PRODUCTION CONTROL
- MARKETING COSTS
- CONTROL OF SALES
- INCENTIVE PLANS
- WORK SIMPLIFICATION AND METHODS
- PLANT AND OFFICE LAYOUT
- TIME AND MOTION STUDY
- OVERALL MANAGEMENT AUDIT

J. EDGAR DION

CONSULTING MANAGEMENT ENGINEERS

4643 SHERBROOKE ST. WEST — MONTREAL 6, CANADA

GLENVIEW 1428

We would be glad to discuss how we may assist you—no obligation naturally.

Cost and Management

VOL. XXX SEPTEMBER No. 8

EFFECTIVE ADMINISTRATION, ORGANIZATION AND MANAGEMENT

By A. M. JENKINS 288

A native of Boston, Mass., Mr. Jenkins has been associated with Canadian Aviation Electronics Ltd. since 1952 and is currently United States Representative with offices in New York. He holds graduate degrees in English and Education from Columbia University and has held a number of distinguished posts in the field of vocational education. He has written extensively on the subjects of Management and Administration and lectured at many universities and to management groups in the U.S. and Canada.

SIGNIFICANT AREAS FOR COST REDUCTION

By B. A. C. HILLS 298

Mr. Hills is president of Urwick, Currie Ltd., management consultants, and senior partner of Urwick, Orr & Partners. Educated in England at the University of London, he gained extensive practical experience in industrial engineering and became a management consultant with Urwick, Orr & Partners, London, in 1934. He was appointed senior partner in charge of the Canadian branch in 1953. Mr. Hills has lectured extensively in the United Kingdom, Canada and the United States on industrial engineering and management organization.

INTEGRATED DATA PROCESSING

By H. S. BROWN 312

Mr. Brown is Assistant to the Sales Manager of R. L. Crain Limited, Ottawa, Ontario, and is currently responsible for the co-ordination of the company's entire I.D.P. programme. Before joining R. L. Crain Limited, Mr. Brown was associated with the Civil Service Commission of Canada where he was responsible for establishing Tabulating procedures.

REGULAR DEPARTMENTS

EDITORIAL COMMENT 282

C. & M. ROUND-UP 285

STUDENT SECTION 319

Published Monthly by the
SOCIETY OF INDUSTRIAL AND COST ACCOUNTANTS OF CANADA
Incorporated 1920
Editorial and Business Offices: 31 Walnut Street South, Hamilton, Ontario
J. N. Allan, R.I.A., Secretary-Manager and Editor

Subscription price to non-members, $5.00 per year. Single copies, 50 cents.

Members desiring five copies or more of a single issue, may obtain them at 25 cents.
Opinions expressed by articles and comment are not necessarily endorsed by the Society of Industrial and Cost Accountants.

Authorized as second class mail, Post Office Department, Ottawa.

Editorial Comment . . .

TAXES AND ALL THAT

An editorial is not, we think, a fit occasion for a technical discussion, but rather something topical and discursive. But the other week in idling through the Financial Post, July 7th issue, we encountered a topic which, while of current interest, warrants some serious thought. The article was titled "Inflation Trend Hurts Trade, Senators Ask New Costs Study".

After revealing that the taxes of the three levels of government take 31 cents out of every dollar earned in the nation, the article proceeded to report that the Senate's Finance Committee had recommended "a study of all production costs, as a step towards curbing inflationary trends and safeguarding Canadian export markets".

This latter information was as surprising as the tax figures, for the recommendation seemed to be resurrecting an old derelict theory which long had fallen from respectability and, presumably, had been quietly buried—that the market price of a product is determined by its cost of production. Admittedly if the market price doesn't cover the average unit cost of production, in the long run the firm will either switch its lines or go out of business. But this is merely an adjustment of the firm to the facts of the market. The price, provided of course there are a number of buyers and sellers, will be established by those two elusive, invisible and impersonal forces, demand and supply.

Alfred Marshall, the great English economist of the first quarter of this century, compared these two forces to the blades of a scissors, which do their job by interacting on each other. We wondered, then, why a government committee, supported by batteries of civil servant experts and advisers, would reason as though the scissors were broken. Out of curiosity, therefore, we looked up the report itself.

Our faith in ourselves, Alfred Marshall, the Committee, and the government experts were all confirmed; in the actual report the horse was before the cart—the higher costs of production were not the cause but the result of the higher prices generated by the inflationary trend, a result which is inevitable unless the inflated costs can be offset by increased productivity.

But as we read on we found our elation changing to a mood of concern. Is the level of taxation too high? Is the actual intake of governments so great as to seriously affect enterprise, accumulation, and the distribution of income and property?

The report didn't give any explicit answers to these queries. Recognizing that financially the government is a sort of reservoir with incoming and outgoing money flows which leave the surplus level virtually constant, the Committee studied the burden of taxation

revenues by examining the amount and kind of government expenditure. Its findings are of great interest: in 1955 Canadians paid out in taxation 31.2 cents of every $1.00 earned, compared with 22.4 cents in 1939 and 17.3 cents in 1929.

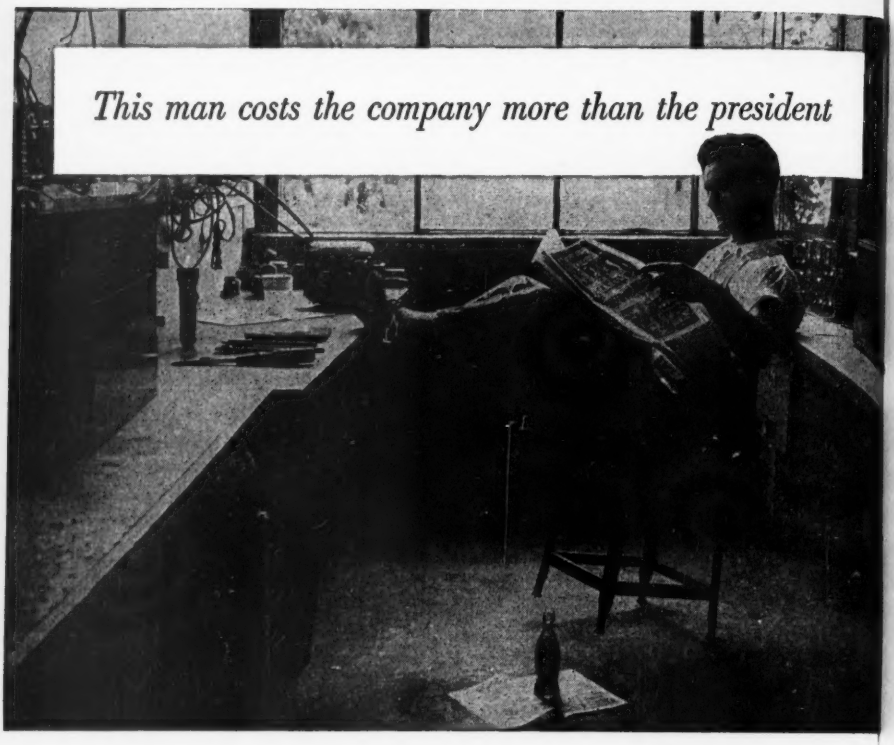
Why, you may ask, has the relative importance of government spending risen? Mainly due, first, to the growth of the welfare state, transfer payments rising from 5 cents of every dollar earned in 1929 to 11.1 cents today, and, second, to the requirements of national defence, defence expenditures rising from .5 cents to 8.4 cents of every dollar. After adjusting for these changes, the unsuspected fact is that the ratio of administrative and executive costs to the national income is the same as it was a quarter century ago.

Let us say at once that we do not think that these changes are necessarily bad. Transfer payments, such as old age pensions, etc., which are simply money payments to Canadian people without their being obliged to perform a service, tend to even out, insofar as they are well conceived, the inequalities of income and property and thereby contribute to a fairer and more responsible society. Even defence expenditures, which the Commission considers a burden—"a diversion of income to what the average Canadian would regard an unproductive use"—we are willing to justify. Surely an expenditure which hitherto has saved us from the fate of Iron Curtain satellites cannot be called unproductive. We, and we think the Canadian people, accept the trend and the amount of taxation required.

But it is regrettable that the Committee didn't give some attention to HOW this taxation is raised. Changes in the tax structure by affecting incentives can reinforce or weaken the economic and social fabric. To what extent, we wonder, has this fabric been worn thin by present tax policies?

Has progressive taxation, for instance, become a massive deterrent, discouraging businessmen from greater efforts by extortionate marginal rates? Has tax discrimination between earner and equity investor become a disrupting force, curbing the qualities of integrity, perseverance, and thrift, and encouraging those of shrewdness, flexibility and speculation?

These are questions we as a nation should long ago have begun to ask, and to which by now we should have begun to answer. They suggest the possibility of fertile innovations of policy if only we would seek; innovations which will encourage enterprise and accumulation, and thereby make a worthwhile contribution to curbing those very inflationary tendencies about which the Senate Committee is so rightly concerned.



At $800 a week, the company's top man is a real bargain. He works hard at the right things, gets a lot accomplished.

At $80 a week, this plant electrician (Sam's his name) is an extravagance – because he doesn't have *enough* to do.

Sam totes his tool box into a number of departments each day. Sometimes he finds work, sometimes he doesn't. When the reports come in (two weeks later), there's no sure way of telling whether he pulled his weight or not. He's chalked up to "overhead" . . . and a potential bit of profit gets lost in a catch-all figure. Year after year.

How to get your money's worth out of Sam? With Keysort punched-card accounting. Keysort will give you a daily breakdown of indirect labor (including maintenance) *by department*. Knowing the facts *on time*, you can keep costs on target by spotting wasted man-hours, pinning down undue fluctuations.

A McBee Keysort installation can give you comprehensive, accurate reports on every phase of factory operation, and give them to you *fast*. On your desk monthly, weekly, daily – depending on your needs. Whether yours is a payroll of thousands or a 100-man branch plant. At remarkably low cost.

The nearby McBee man can show you how it's done. *It will take him one hour, from start to finish.* Phone him, or write us.

McBEE KEYSORT.®

Punched-card accounting for any business

Manufactured exclusively by **The McBee Company Limited**, 179 Bartley Drive, Toronto 16, Ont.
Division of Royal McBee Corporation • *Sales and Service in Principal Cities across Canada*

C. & M. Round-Up . . .

By N. R. Barfoot

LOOKING AHEAD

Operations Research in Canada is due for a major development. Three large companies now have O.R. teams planning the future. These teams are made up of various combinations of economists, physicists, production and advertising experts and others. To date, these companies seem well pleased with the results.

—o—o—

Higher Wages. The increase in labour income has stemmed from a larger population . . . higher wage rates . . . and also from greater productivity. During the same period — since 1939 — the gross national product has also risen about five times. In no year did labour income shrink and the trend towards higher wage rates is almost sure to persist because of the smaller proportion of the total population in the working force age group and also because of the possibility of rising prices.

—o—o—

Canadian Automobile production continues at a high rate. Despite a 30% drop in U.S. car production for the first six months of this year, Canadian production is as good as 1955 for the same period.

In the period 1946-1952, 349,000 cars were scrapped.

In the last three years 336,000 cars were scrapped.

High rate of scrappage is one reason for high 55-56 new car sales.

37% of cars and trucks produced in Canada last year were for replacement.

There is no serious inventory glut in dealers' hands.

—o—o—

ELECTRICITY IN CANADA

Canadians are second largest per capita consumers of electricity in the world.

Power producing utilities in Canada had a net generating capability in 1955 of 13,905,000 kw, an increase of 41% since 1951.

Power production in 1955 rose from 69,135 to 76,201 million kwhr, an increase of 10%.

Estimated change from 1955 to 1959 is 39% and from 1951 to 1959, 96%.

The firm energy requirements in 1955 were 72,633 million of kwhr which, it is forecast, will reach 101,508 million kwhr by 1959 — an increase of nearly 40%.

Should present rate of growth continue, the industry will construct more new generating plants in the next ten years than it has in the entire history.

4,300,000 customers are now receiving electric service — some 92% of Canadian households. In 1939, 1,940,000 received electric service.

70% of the estimated 630,000 farm dwellings were receiving electric service in 1955.

—o—o—

EMPLOYMENT

Employment opportunities will be better than they've been for years.

Only 165,000 were unemployed and seeking work at May 19 — or 2.9% of the civilian labour force of 5,664,000.

Last year 213,000 persons or 3.9% of the 5,537,000 man labour force were without jobs and seeking work.

The 5,499,000 people with jobs at May 19 were 173,000 greater than a month earlier . . . 175,000 more than in May 1955.

—o—o—

ON THE PERSONAL SIDE

How are you as an executive? Here are a few points to watch:

1. Regardless of training and experience, he is receptive to new ideas, able to adapt quickly to changing conditions and withstand set-backs without losing enthusiasm.

2. In the absence of one member of the executive team the other members are willing and able to carry on his functions.

3. A good executive builds his own efficient division in the company with a minimum of supervision.

4. He is able to balance and control (1) the desire for maintaining, improving and continuing the status quo and (2) an impulse toward growth and development of new products, new markets and new economic alternatives that may be more profitable than the ones the company already has.

—o—o—

The Do-It-Yourself boom was responsible last year for 600,000 accidents. About 15,000 amateur carpenters smashed their thumbs or otherwise did themselves in, and 57,000 people banged themselves up climbing around the gutters and eaves troughs of roofs.

Also, the cost of doing it yourself has risen so much that many people can no longer afford to do it themselves.

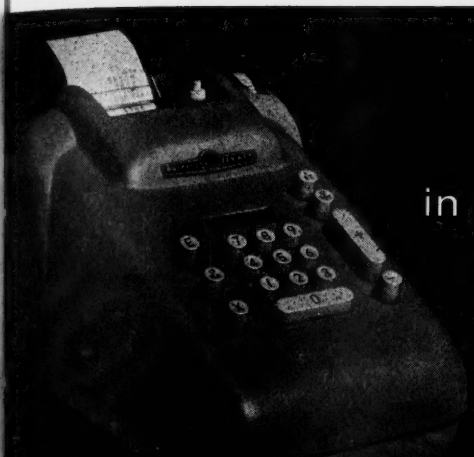
—o—o—

Illuminated telephone dials will permit you, next year, to find it easier to take bedside notes during nighttime phone calls. The dial will light up as you pick up the receiver. Cost — 50c a month.

—o—o—

To keep up with the Jones next year, you'll need a family income of more than $5,000. Average family income in Canada went up 8% last year to $4,460, will go up 6.4% this year to $4,745 and to $5,077 in 1957, assuming we manage a 1957 increase of 7%. U.S. Department of Commerce has just announced U.S. family income rose a little more than 3% in 1955 to $5,520.

PAYNE, PATTON & PUGSLEY
CHARTERED ACCOUNTANTS
Gordon S. J. Payne, C.A. Donald R. Patton, C.A.
Philip T. R. Pugsley, C.A.
Suite 14, The Linton,
1509 Sherbrooke St. West Montreal, Que.



Try them
in your office . . .
then decide

The Burroughs Ten Key and Burroughs Director

Now you can try a great new Burroughs adding-subtracting machine in your office, on your own work, at our expense! See for yourself those features that make big work loads melt *fast*—the self-repeating multiplication key and instant credit balances, for example.

And remember, you can rely on Burroughs to offer business machines precision-engineered for the utmost in accuracy, coupled with the rugged dependability that means extra years of performance. Why not phone today for a demonstration without obligation? Our local branch office or dealer is listed in the Yellow Pages of your phone book.

Burroughs

"Burroughs" is a trademark.

BURROUGHS ADDING MACHINE OF CANADA, LIMITED. FACTORY AT WINDSOR, ONTARIO.

Effective Administration, Organization and Management. . .*

By A. M. JENKINS, O.B.E.,
Manager, Contracts Administration Dept., Canadian Aviation Electronics Limited

Will the economic future of man be the Garden of Eden visualized by the prophets of automation? Perhaps not, but the future will certainly depend to a great extent on the intelligent application of the principles of scientific management to the progress of industry. Dramatically tracing man's struggle for economic progress through the ages, the author proceeds to define administration, organization and management and their inter-relationships and to show how they may be used in their highest meaning for the good of all.

The Economic Struggle Through the Ages

THE HISTORY of work through the ages would not appear on a chart as a long and unbroken rising line. The age-long struggle of workers for a better, fuller, freer life has followed an erratic course. It has been a halting, wearisome climb—a step forward, a slide backward—a renewal of the upward ascent to a point beyond one ever attained before—ever onward and upward, driven by an inner urge that has neither form nor substance but possesses the same powerful energy that forces the germinating seed to seek the light shining above its damp, dark enclosure. Nowhere is the character of man's progress more evident than in the history of man's work.

We shall pass over the early chapters and proceed to the fifth day of January 1769, when James Watt obtained a patent for his newly-perfected "fire machine"—a day which, as Van Loon suggested, divides an earlier past from an age in which work and life in all its aspects were fashioned by machines whose very power at first overwhelmed and almost defeated the purpose of man who created them. Then followed, in 1850, the first ugly factory in Manchester, and later the hundreds of ugly factories in England, Europe and the United States. And with the ugly factories came the ugly lives of workers in an age that placed human values lower than those of machines. The earlier years of the Industrial Revolution were marked by overwork of incompetent, untrained and unwilling labour, horrible industrial accidents and woeful disease. And the factory owners of those days did not seem to know or care about the incredible losses sustained by such waste of human resources.

The Growth of Scientific Industrial Management

During that period a few enlightened men raised their voices. In the 1830's Charles Babbage, an Englishman, laid the foundations of the science of industrial management as we know it. But the roar of machines was so loud that few heard or heeded his teachings. After an

*An address delivered at the 35th Cost and Management Conference of the Society of Industrial and Cost Accountants of Canada in June 1956 at Mont Tremblant, Quebec.

eclipse which had lasted half a century, the rebirth of this Science was successfully advocated in the 1880's by two Americans, Henry R. Towne and Henry C. Metcalfe. But the *practice* of industrial management ignored the *science* of industrial management until Frederick Winslow Taylor, an American, bridged the gap between them. Of the great stars in the galaxy of scientific management, Taylor's is the highest and brightest.

But while we as pupils may not surpass the master, we have learned one cardinal lesson which Taylor, despite his sincerity, high motives and wealth of experience with workers, seemed to have overlooked. It was his contention that "what workmen want from their employers beyond anything else is high wages". We know now that Taylor was wrong; we have learned that there is more, much more, involved than this; that motivation is highly complicated and the will to work is influenced by many conditions of which penalties and rewards are but two. We know, in short, that five cents more an hour will not, as Taylor insisted, cure most gripes in the plant.

Neverthless, the concepts of scientific management advocated by Taylor and his followers, such as Galbreaths, Gantt, Hathaway, Thompson, Emerson and others, slowly permeated industry from 1903 to 1921. During this same period, efforts to broaden Taylor's concepts were being made, in both industrial and academic circles, under the leadership of men like Humphreys, Diemer, Rautenstrauch and Babcock.

From 1921 to 1945, principally influenced by three factors, industrial management became more and more willing to apply these scientific methods. The first factor was the vast industrial expansion during the two world wars; the second was the Hoover Report on Waste in Industry, made in 1921, which fully endorsed the concepts of scientific management advocated by Taylor and others; and the third, by far the most significant in my opinion, was the famous Hawthorne experiment by the Western Electric Company, in close association with Harvard, MIT and the Rockefeller Foundation. The principal finding from this experiment, which commenced in 1924 and continued for 16 years, is almost incredible when stated in a few words. It was simply found that man was not a machine; that his productivity was a function of attitude. This finding, far more momentous then than it might sound today, set in motion a period of intense activity in the field of human relations.

During the past ten years, since the close of World War II, increasing attention has been given to the human factor in industry, resulting in considerable changes in fundamental concepts of management. There has, moreover, been more and more cooperation between industry and scientific research in the field of industrial management. So much, or so little then, for the past.

The Ultimate Meaning of Administration

As for the future, the trend seems clear. The science of industrial management, dominated by economic considerations but deeply concerned with human emotions and the highest problems of the future of civilization, is using the methods of a number of sciences which are not always compatible with each other. To avoid damaging conflicts in methodology, which have actually developed, there appears to be need for much greater integration of this increasingly complex science. The future of scientific management will largely depend on the result of efforts made in this direction by all who are involved or interested in management.

Or may I put it another way? The future of scientific management will largely depend on the impetus given by us and others to the development of an ultimate science of administration whose objective will be order; order among men; order which will permit their free cooperation and the release and utilization of all their varied talents and skills; order which will make possible the realization of the great potentialities for good that their progress toward order has already created, potentialities that will be multiplied beyond present comprehension by the attainment of higher degrees of order.

In its broadest sense, administration—in which, for the moment, I include management and organization—may be said to involve the determination and expression of the objectives of the group with which it is concerned; the formulation, execution and control of plans for attaining those objectives; the design of the organizational structures which determine the relationships between and among the various members of the group; the selection, measurement and training of people for the organization; the development and application of objective criteria for judging the performance of the group, individually and collectively, and of incentives for encouraging and rewarding their performance; the coordination and unification of the group in the attainment of its objectives; the development and maintenance of the ethics, morale and spirit of the members and the identification of their individual aspirations with those of the group; the establishment of cooperation with other groups. In brief, administration is that vitally important skill which determines most of the complex social, political and economic relationships between people in the fulfillment of their wants and needs. It is therefore the transcendent instrument for maintaining order and bringing progress toward higher order.

That, to me, is the meaning, the goal, the function of administration. But many would consider this definition too broad, too sweeping, too comprehensive. They would insist that these three terms should be defined separately; and, for the purpose of this paper, it may be well to do so. We would search in vain, however, for full agreement on the meaning of these words, and to compare various definitions

would only confuse the issue. So perhaps it is best to concentrate on definitions which are generally accepted.

The Elements of Administration Defined

An *organization* is constituted by certain elements brought together to serve a given purpose. It is characterized by the pattern of relationships established between these elements. The elements of a manufacturing enterprise, for instance, include men, materials, machines, buildings and money, to mention but a few. These elements become an organized business when certain patterns of relationships are established between them for the purpose of producing goods.

The *administration* of a business is that part performing the functions which determine the pattern of relationships and cause it to be modified as conditions may require.

The *management* of a business consists of supervision of the work to be done and seeing to it that the work is done according to the programme of activities specified or implied in the pattern of organization.

In other words, the managerial duties and the individuals who are to perform them are specified in the organizational pattern. The structure of the organizational pattern and the methods of management are determined or approved by the administrative offices. The members of the board of directors of a company, or the owner of a business, are normally responsible for performance of the administrative function. But they may, and in fact do, delegate some of their responsibilities to other individuals. (Most directors I know seem willing to delegate all their responsibilities except the pleasant one of clipping their dividend coupons!) Thus, some members of management may serve in an administrative as well as a managerial capacity. The president of a company and other high-ranking executives operate normally in such dual capacity, the former for the organization as a whole, the latter within the limits of their own jurisdiction in the organizational pattern.

The Mechanics and Dynamics of Management

At the outset of his case for a theory of organization, Urwick raises the question of whether it is possible to have such a theory; and agrees that it is on one condition; that a clear distinction be made between the *mechanics* of management—those parts or aspects of any management problem in which people as individuals can be ignored—and the *dynamics* of management—those parts or aspects of any management problem in which people as individuals must be dealt with.

You probably are wondering whether, in practice, there can be any management problem which ultimately does not come back to the individual and the ways he thinks, feels and acts. And Urwick would grant you the point. But because this may be true in practice, it does not follow that the distinction between the mechanics and dynamics

of management is artificial or that it serves no useful purpose. Many distinctions which do not yield practical results are nevertheless very useful. They are mental tools, Urwick insists, and you can only build up a theory on any subject—you can only learn to think about it clearly —if you train your mind to use these tools. One of them is called "analysis". It is the tool with which we take an idea or a thought process to pieces, identify and define its different elements, and examine them separately.

Now, if we analyze the overall activity which we call "management", we shall find that it can be broken down into six aspects. Linking them together and applying to all is a seventh—*communicating.* The first three aspects—*forecasting, planning* and *organizing—belong* primarily to the mechanics of management. They are activities which can be carried on, and are best carried on, without reference to or thought of people as individuals. The second three—*commanding, coordinating* and *controlling*—belong primarily to the dynamics of management. They can be carried on effectively only if we think all the time of people as individuals. And that is not entirely an intellectual process. At the present stage of human development, our judgment of, our sympathy with, our "feel" for other human beings are often more important than our knowledge or mental capacity.

In saying this Urwick does not intend to imply that either group of aspects is wholly and exclusively mechanics or dynamics, but only that they are predominantly so. What is important is that we should deal with them in the right order and keep the two concepts distinct in our minds. In striving for the "ideal" organization, this means that we should prepare our structure without reference to individuals, whether or not they may be available to fill the various positions. Such a procedure does not reflect an indifference to people or any doubt as to the overwhelming importance of the individual in our society, but to the belief that by dealing with organization in this way we can deal with human beings most justly and kindly.

The Ten Principles of Organization

Now, since organization is the process of dividing up all the activities necessary to any purpose and arranging them in groups which may be assigned to individual, it is logical that the first principle of organization should be the *Principle of the Objective.* This states that every organization and every part of an organization must be an expression of its overall objective. We cannot organize in a vacuum; we must organize *for* something. Unless we have an objective, there is no reason why individuals should cooperate at all or why anyone should try to organize them.

The attainment of this objective depends upon the success with which we secure the maximum advantages of the subdivision or specialization of effort while, at the same time, we retain unity of effort. Hence

the second and third principles of organization: the *Principle of Specialization*, which states that the duties of every member of an organized group should be confined, as far as possible, to the performance of a single function; and the *Principle of Coordination*, which states that the basic reason for organizing is to facilitate coordination or, in other words, to achieve unity of effort.

Effective coordination is attained principally through the skill, logic and clarity with which we establish relationships between people. Basic to this are two questions which must be answered regarding every position: "What is the incumbent required to do"? and "How is he to do it"? Thus we come to the fourth and fifth principles of organization: the *Principle of Authority*, which states that in every organized group the supreme authority must rest somewhere, and that there should be a clear line of authority from the supreme authority to every individual in the group; and the *Principle of Responsibility*, which states that the responsibility of the superior for the acts of his subordinates is absolute.

These two principles, like all the others, make sense; because everyone employed in an organized group is entitled to know certain things. First, who his boss is; every man should be clear as to whom he is accountable. Second, how his boss got his authority; that is, the line of delegation from the supreme authority to his immediate boss. Third, that he will be supported in carrying out instructions from his immediate boss; he has a right to such assurance. The failure to identify, distinguish and define these elements—authority and responsibility—is responsible for incalculable confusion and misunderstanding in organization.

One of the major causes of waste and frustration in human systems of cooperation is the overlapping of authorities or functions. This leads to duplication of effort, disputes as to competence, back passing and, in its more extreme forms, an all-round refusal of executives to face up to the job and make the decisions necessary to get on with it. This is generally traceable to uncertainty as to the limits within which initiative will be welcomed and the exercise of authority, without reference up the line, accepted. Men will always do better work and preserve a higher morale if they know clearly and precisely what is expected of them. The sixth principle of organization is therefore the *Principle of Definition*, which states that the content of each position —that is, the duties involved, the authority and responsibility contemplated, and the relationships with other positions—should be clearly defined in writing and published to all concerned.

Four further principles apply to the analysis and grouping of authority and responsibility in the process of organization. If we consider the principles of responsibility and definition, it is obviously unreasonable to hold an individual responsible, that is accountable, for

any course of action unless he is given the formal authority necessary to require action of others. Equally it is folly to give a person authority without holding him responsible for the results of the exercise of that authority. Hence the *Principle of Correspondence*, which states that in every position the responsibility and the authority should correspond. In my opinion, the violation of no other principle of organization can bring so much grief, inefficiency, waste or frustration as this one.

The eighth principle, *Span of Control*, states that no person should supervise more than five or, at the most, six direct subordinates whose work interlocks. While this principle is often disputed on various—and frequently valid—grounds, there is both empirical and scientific support for the thesis that there are limits to the number of subordinates who can be controlled directly by one man.

In *The Soul and Body of an Army*, for instance, Sir Ian Hamilton points out that "the average human brain finds its effective scope in handling three to six other brains . . . . As to whether the groups are three, four, five or six, it is useful to bear in mind a by-law: the smaller the responsibility of the group member, the larger may be the number of the group—and vice versa". (Sir Ian was too much of an English gentleman to carry out his *vice versa* to its painful conclusion—that there are those who cannot handle even one brain let alone five or six others!)

It is known, too, that the human mind is restricted in its scope by what is called the span of attention. Because of this, most of us find it difficult to keep within focus more than a certain number of items simultaneously. To test this, try to memorize readily a group of more than four or five digits. And bear in mind that a superior is directly responsible for and concerned with not only five or six subordinates but also the relationships between them. In other words, he is preoccupied not merely with A and B and C and D but with A plus B plus C plus D and so on. This mounts in geometric rather than arithmetic progression.

Just as the strength of a chain is that of its weakest link and the speed of a fleet is that of its slowest ship, so the efficiency of an organization is that of its least effective function. This is obvious if we reflect on the uselessness of a brilliant research unit, a superb product design, and the most modern manufacturing methods backed by a team of star salesmen, if transportation cannot deliver the goods when they have been sold or accounting is so inaccurate that money cannot be collected after the goods have been delivered. But while extreme cases such as this are obvious, many minor instances of unequal standards of effectiveness between departments are constantly occurring in business. Hence the *Principle of Balance*, which simply states that the various units of an organization must be kept in balance.

Finally we come to the tenth and last of the principles of organization expounded by Urwick: the *Principle of Continuity*, which states

that reorganization is a continuous process, and in every undertaking specific provision should be made for it. This principle stems from the realization that if balance is to be preserved, organization is not a task which is ever finished and done with. We cannot draw up an organization chart and say, "That's that".

These ten principles of organization are the fundamental truths a man should grasp if he is to make any pretense of knowing organization. But let me emphasize that there is no universal organization structure in which every industrial enterprise can be housed, any more than there is a universal manufacturing structure in which every productive process can be housed. Organizational practice consists of knowing these organizational truths and in applying them, as Fayol stated, with "intelligence, experience, decision and proportion".

The Responsibilities of Management

Now I would like to tell you briefly what management means to me. Management is opportunity. It is opportunity to be of service to others. In any organization an individual manager has the opportunity to serve his superiors and his subordinates. He serves his superiors by making certain that the people and facilities under his jurisdiction do in fact provide the kind of support the next higher level of management requires to meet its responsibilities. This calls for a clear understanding of assigned functions, an acceptance of the authority granted and the responsibility imposed, a willingness to act on his own initiative within prescribed boundries, a capacity for creative thinking and decision-making, and a desire to accomplish his work with the resources allocated if at all possible.

The manager serves his subordinates by creating and maintaining within his organizational entity a working climate conductive to drawing out their best efforts. This requires that the manager himself plan ahead, give guidance when necessary, appraise performance and correct it when such is indicated. He must provide the incentive which springs from recognition of work well done.

Management is a challenge to grow professionally and intellectually. The manager of today and tomorrow must be prepared to put to practical use the accumulated wisdom of the social and physical sciences. This calls for ability to integrate the activities of numerous specialists. It demands sufficient knowledge of the capabilities, potentials and limitations of personnel, material and techniques under his jurisdiction so that he may make sound decisions.

The manager must constantly seek to improve his ability to inspire and motivate his subordinates. This is a matter of leadership which involves the strengthening of personal qualifications that draw from his men their finest efforts in his behalf. In this area, attitudes are of first importance because the organizational attitude is a clear reflection of the manager's attitudes, unleashing abilities that achieve maximum effectiveness.

Management is an instrumentality to release and stimulate the creativity of subordinates. Creative thinking normally occurs only with unhampered exchange of information among people at different levels of authority. It requires opportunity to make a mistake without undue penalty. It needs an environment in which subordinates can grow in their own right. Management provides the opportunity and imposes a duty upon the individual manager to do everything possible to help all in the organization live more fruitful lives so that they may derive more satisfaction from their work.

The manager must help and participate in the growth of his subordinates. This implies self-development of all concerned because personal growth seldom if ever occurs by fiat. But the manager has a responsibility to aid the subordinate through leadership and example as well as by making available to him opportunity for participation in activities which contribute to growth.

Management is opportunity to give meaning to organized activity by unselfishly furnishing the guidance necessary to produce the results needed by society. It is a challenge to continue to grow personally, morally as well as intellectually, and to aid others in their own self-development. It is a trusteeship with responsibility to those in the organization itself, to all who are affected by the activities of the organization, and to the public at large, because the impact of management is decisive.

FOR FURTHER READING

THE DYNAMICS OF INDUSTRIAL MANAGEMENT, by Raymond Villers, Funk & Wagnalls, New York.

THE ECONOMICS OF INDUSTRIAL MANAGEMENT, by Rautenstrauch & Villers, Funk & Wagnalls, New York.

DEFINING OBJECTIVES IN MANAGEMENT DEVELOPMENT, by H. J. Phillips, Jr., A.M.A. General Management Series No. 173.

AN APPRAISAL OF MANAGEMENT, by Michael Albery, Parts I and II, Cost and Management, June and October 1954.

OBITUARIES

With deepest regret we announce the deaths of Mr. and Mrs. Gowan R. Williams who were killed in an automobile accident on August 27th. Mr. Williams was a Charter Member of the Saskatchewan Society and was active in the affairs of the Society since its organization, serving as Secretary-Treasurer, Registrar and Vice-President. He was also a Director of the National Board.

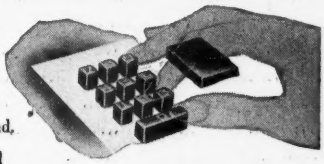
We regretfully announce the death of John C. Bouskill, C.A., R.I.A., a former member of the Quebec Society who died in the Montreal General Hospital after a lengthy illness on July 31st. He was Secretary-Treasurer of the Miner Rubber Company Limited, Granby, Quebec.

Simplest accounting machine keyboard of all time!

with exclusive

10-KEY TOUCH OPERATION

The multi-purpose machine designed to meet the accounting requirements of modern business. It's so easy to operate too! Anyone in your office can learn to operate an Underwood Sundstrand in just a few minutes . . . just 10 numeral keys . . . all arranged in logical sequence under the finger tips of one hand.



The famous, fast, accurate Sundstrand 10-key keyboard is an Underwood "exclusive" in the accounting machine field; it minimizes hand motion . . . helps your operators turn out more work, with greater ease, and in less time.

You will appreciate Underwood Sundstrand's time-saving versatility too, for switching from one application to another on an Underwood Sundstrand Accounting Machine is accomplished in seconds.

Use the coupon below, to send for the whole Underwood Sundstrand "speed, simplicity, and versatility" story.

Underwood Limited

UNDERWOOD

ACCOUNTING MACHINE DIVISION
Head Office: 135 Victoria St., Toronto 1, Ontario

COMPANY OWNED BRANCHES AND SERVICE IN ALL PRINCIPAL CANADIAN CITIES

Underwood Sundstrand

The Original Touch Method Keyboard

Underwood Limited, 135 Victoria St., Toronto 1, Ont.

Please send me your illustrated folder describing the time and money-saving advantages of Underwood Sundstrand Accounting Machines.

NAME..... TITLE.....

COMPANY.....

ADDRESS.....

CITY.....

CM 9 56

Significant Areas for Cost Reduction. . .*

By B. A. C. Hills, M.B.E., B.S., Eng.,
President, Urwick, Currie & Co. Ltd.,
Montreal, Quebec

None of the areas for possible cost reduction in a manufacturing enterprise can be considered independently of the rest, the author maintains. Within this framework, the following article examines some of the most profitable areas for cost reduction and their inter-relationships.

THE TITLE of this paper requires me to throw the limelight on those items of expenditure in an enterprise where there is the greatest scope for their reduction. That seems a sensible thing to do, if only because the man who wants results directs his efforts into those channels which will show the maximum return.

The Inter-Relationship of Cost Elements

The temptation, however, is to pick areas here and there in an unrelated fashion. It is, for example, easy to show the very substantial financial advantages of reducing inventory. But such a cost reduction —in this case, the cost of locking up capital and occupying unnecessary room and services—made without reference to the effect on other items of expenditure would be foolish because it ignores a very important principle:—Any attempt at cost reduction must be made with the object of reducing the *total* cost of the product or service. It is the minimum *total cost* we are after. And this can only be achieved by ensuring the maximum output of finished goods or services from the minimum total resources in material, labour, equipment, space, power, time and money. The money factor is, of course, associated with each of those items if minimum costs are to result, and it is the minimum total expenditure on those items which, with maximum output, will achieve minimum costs. But we cannot say that minimum total expenditure necessarily results from minimum expenditure on each of the cost elements making up the total—often the very opposite is true. A few examples will make my point clear. The cheapest form of material for a particular component might be mild steel and this would constitute minimum expenditure on the material element. But the use of a more expensive material, such as leadloy, may reduce labour costs and overheads and save capital expenditure and depreciation costs on equipment, because of the higher cutting speeds which can be employed. These savings many easily outweigh the additional material cost per component.

Again, the cheapest form of labour may lead to excessive inspection costs, high material wastage, and poor utilization of space and plant. Or insufficient expenditure on production engineering and product

*An address delivered at the 35th Cost and Management Conference of the Society of Industrial and Cost Accountants of Canada in June 1956 at Mont Tremblant, Quebec.

design staff can readily incur excessive material, labour and expense costs per unit of production. Many more examples will doubtless come to your mind.

Thus we can state this important principle—because it is the *minimum total cost* per unit of production which gives economic manufacture, the correct or optimum cost of each of the cost elements must be determined in relation to the others. That is to say, we cannot arrive at the correct or optimum cost of any cost element without taking into account the effect on other costs.

What we have to do, in effect, to select the correct material, type of labour, factory layout or piece of equipment, is to list up all the items of expenditure affected. We have to draw up a profit and Loss account of the financial "pros" and "cons" of the possible alternatives, and in each case, as I see it, we have to seek the same objectives:—

1. To determine the optimum form from a cost point of view by taking all related expenditure into account.

2. To ensure the maximum utilization of the resources in question —by reducing scrapping and wastage to a minimum, by eliminating unnecessary movement of men and material, by preventing down-time for machines and waiting time for men.

Teamwork Is Imperative

Now this brings out another principle which is worth noting here. In determining what is the best material, the correct factory layout or the most effective procedure, there can be no departmentalizing or unilateral consideration and by the same token there can be no departmentalizing of the work of the men concerned in designing the product, buying the material, laying out the factory, determining the processes, and selling the products. An essential principle of cost reduction is therefore teamwork, a co-ordination of effort throughout the organization—so much so that the brilliant individualist in any one function may cost more through his inability to work with others than he saves with his "Brainwaves".

Having got so far, let us now see how this principle works in a manufacturing unit. There is a significant area for cost reduction, for example, in the product designer's work. Lack of consideration of the effect on production costs of his selection of material and shape can so easily mean unnecessarily expensive processing. I recall one classic example of this in the aircraft industry. The machine in question had to be built in two halves at a heavy additional cost in order to accommodate the pilot's cockpit as it was originally designed. Yet this could have been avoided by closer collaboration between the designers and the production engineer in the earlier stages.

There are other less obvious ways in which the expenditure of a little more time and thought by the designer, and the selection of other

than the obvious shape, size or quality of material can lead to more economic manufacture—and note again how this ties in with the principle already stated, for it may mean spending a bit more on design costs, a bit more on material costs.

Standardization of Materials

One of the most important applications of the principle in this field involves standardization of materials, with which I would now like to deal in some detail.

It is often easier for the designer to use a new size of material, i.e., one not already stocked—than to look up reference books in order to work with established sizes. Again, the use of a specific size requires ingenuity and thought, and sometimes the revision of an earlier selection or design. Some designers are only too ready to specify new types of materials which may have caught their eye, only to drop them again as soon as something new takes their fancy. And even the best designer often chooses the dimension which is exactly determined by the calculation of stresses and strains. For these and other reasons, many new dimensions and specifications of materials are created constantly in the drawing office. And yet, if the designer would work to a standardized range of materials, look what subsequent economies would be achieved!

Purchasing costs would be reduced; much more buying effort has to be expended in obtaining the odd size or unusual specification of material than in maintaining stocks of standard materials. Again, many materials are priced on a volume basis, and a small parcel of non-standard material may cost considerably more than the relevant standard. For this reason alone it may often pay to use a dimension greater than necessary but which is in the standard range. The more advantageous bulk price of the heavier material can mean a cheaper cost per unit of production.

In the factory itself, excessive variety means more bin space in order to keep the variations separated; more recording and greater chances of error. But excessive variety in itself produces excess stocks for the following reasons:—

(a) It becomes increasingly difficult to store like things in the same place. An outstanding example of this—an actual one—was the storage in different stores of the same plant of (i) ¼″ silver steel, (ii) ¼″ dia. steel, silver, (iii) ¼″ dowell steel, and (iv) ¼″ steel specification X—all exactly the same material.

(b) Unnecessary purchases may be made because of the difficulty of locating and recording for easy reference stocks already available.

(c) Minimum stocks have to be kept in a greater number of cases. Minimum stocks cannot always be related to the rate of usage,

and the sum of the minimum stocks in two varieties is invariably greater than the minimum stock in one if it can be used instead.

(d) Stocks are made higher than necessary because often the buyer can only purchase in certain minimum quantities.

Thus excess stocks are created, and excess stocks lead to excessive storage space; excessive handling costs with more storekeepers than is necessary; additional heating and lighting costs; and most important of all from the economic angle, capital locked up which could be employed otherwise—capital failing to finance further production or to earn interest. A glance at your own balance sheet will tell you how much more cash would be available if you reduced stocks by 10%, and such a reduction in my experience is easily achieved by standardization. Let me quote you some actual figures of reductions obtained in the case of one company with which I was associated:

	Original No. Of Varieties	Reduced to	% Reduction
Bright Mild Strip	863	505	41%
Spring Steel Wire Gauges	39	16	59%
Bright Mild Steel Rod up to 1" dia.	63	29	54%
Oils and Greases	223	108	52%
Paints, Thinners and Powders	600	278	54%

The list could be continued, but I think I have indicated that the potential reduction in this field is something more than the conservative 10% quoted. Standardization can indeed be an important weapon in economic manufacture. Experience has shown, however, that it cannot be easily introduced or maintained—particularly the latter—without a good coding and classification scheme. The essentials of such a scheme are that (a) the code itself should readily identify the material as to broad class, specification, shape or section, and size; (b) the code should ensure only one place for every item and not a number of selective alternatives; (c) the code should automatically bring like things together by its use as the means of stores location.

Putting Standardization Into Practice

The progressive steps towards standardization are then:—

1. Listing all items currently and previously used in production, both direct and indirect, raw materials and purchased parts.
2. Building up a code to meet the requirements indicated relative to the complete range of the listed items. A numerical code is usually the most effective.
3. Simplification of the existing range of items. Rarely used items are cut out and a limited range is selected which will adequately cover normal requirements. Where, for example, two or more dimensions are consistently used which are sufficiently

near each other to be served by one, the dimension is selected which will best fit into the pattern of the range. The selection of the range is, of course, based on usage determined by available records such as purchasing.

4. Finally, standardization. This involves compiling and issuing to all relevant personnel simple reference tables showing the selected or "standard" items and the introduction of a control on requisitioning which will reveal demands for "non-standard" material.

Note again how standardization fits in with the principle we have already discussed. It involves the deliberate use of material which may be of slightly greater dimension than is actually necessary, because the other "financial pros" make it worth while to do so. The little extra cost, at the beginning, not only of the material itself, but also incurred by the necessary organization and working of the scheme, saves much more in the later stages.

Good Utilization of Materials

The second objective referred to earlier is to ensure the maximum utilization of the resource in question—in this case, material. As indicated, the first essential is the fullest co-operation between the product designer, the process planner and the buyer, the cost accountant being co-opted extensively throughout their deliberations. Not one of these specialists can determine by himself whether a casting or a pressing is the cheaper and more effective, whether this process or that should be used. It goes further than that, however. The actions of the product designer have a substantial effect on the amount of scrapping likely to be incurred; the process planner, by selecting too "cheap" a process can seriously affect the quality of the finished product and so cause further scrapping or rectification costs. The buyer, moreover, can make his contribution to poor utilization by failing to supply the required standard of quality—and here may I stress the importance of good quality control at the reception of the raw material. From my experience I would suggest that the lack of it is the cause of more excess costs than any other factor. So important is it that the material delivered should be correct and up to the required standard that I would place this quality control under the buyer—after all, he has the greatest influence with the supplier and can do most towards keeping them up to scratch.

Getting the Most From Labour

I want now to discuss the application of the principle to another cost field—that of labour. Wage rates have increased so substantially from the beginning of the century that labour costs now constitute the chief objective of our attack. We are, in fact, in the second stage in mechanization. The introduction of machinery in the last century so

reduced production costs as to make the labour content of little importance relative to the price that could be obtained for the article. The result was that for half a century there was little incentive, no real impetus, to use better machinery, or to extend its use. From the beginning of this century, labour began to obtain better rewards for its output. In Great Britain the pace was retarded by recurrent periods of considerable unemployment, but on this continent generally the demands for labour to meet the increasing demands for goods exceeded the supply of craftsmen, of plant workers. The result was ever-increasing labour rates, which provided a strong incentive for further mechanization, a further extension in the use of machines to replace manual labour. To maintain and improve standards of living in the face of continuously rising wages there was and still is only one solution—the transfer of labour to the making of machines which will save more than their number in the production and handling of goods.

From the plant angle the situation has resulted in our regarding all labour—that is indirect as well as direct—as an important factor in production costs. Hitherto most of our efforts have been concentrated on obtaining the maximum output from productive men and machinery. Now we must ensure the maximum output from the *total* number of our employees. This is one of the most essential principles in seeking minimum total costs. While it is useful to differentiate between productive and non-productive workers, between direct and indirect operators, there must be no differentiation when it comes to efforts towards obtaining value for money. The same effort that is put into establishing reasonable piece rates must also be put into establishing minimum costs for handling between operations, storekeeping, progress chasing, inspecting and clerical work—in fact, all the operations ancilliary to actual production.

One of the simplest and yet most productive steps towards economic manufacture is to list up all the men and women on your payroll under two headings—direct operators, working machines or assembling, and indirect operators on the ancilliary operations. Then relate the two totals. Often it will be found to be of the order of one to one. But whatever the relationship, one can assume quite safely that the number of indirects is higher than it need be.

Consideration of labour costs from the economic angle, therefore, falls into two natural parts.

1. We must ensure the maximum output per man hour from direct operators.
2. We must ensure the minimum expenditure on indirect operators per unit of production.

Utilize Direct Workers Fully

Let us consider the first—maximum output per man hour from direct operators.

This involves the following:—

(a) A dynamic machinery replacement policy, so that full advantage is taken of progress made in the design of machines and plant

(b) Careful study of optimum machine speeds, bearing in mind the effect on finish and possible rectification

(c) Selection of materials which will permit faster processing

(d) Determination of the best method or process, with the elimination of unnecessary manual movement. In this respect, work study plays an important part

(e) Establishment of correct piece-rates or time standards. And note that they must be correct, otherwise excess labour will be locked up in the rate so long as the particular job lasts. Moreover, too generous a piece-rate reduces operator productivity or output—the worker deliberately reduces his rate of working in order to avoid high earnings which would draw attention to the loose piece-rate.

(f) Above all, the closest collaboration between the design office and the production engineer, to produce the design which is simplest to make.

In each of the foregoing other than labour costs are involved and once again we see the need for weighing the financial pros and cons. Particularly is this so in the establishment of correct piece-rates. In mass production a small error in fixing a rate is multiplied by the tens of thousands of the production quantity, and it will pay to spend a good deal of money both on training time-study men and on their subsequent studies. But as the quantity to be processed is reduced, the degree of accuracy becomes less important until the cost of establishing a more correct piece-rate outweighs the cost of the error saved. With relatively small quantities, good estimating is sufficient.

Because it is indeed a significant area for cost reduction, I want to expand on what has been said about accurate rate-setting. Determining labour standards demands careful training and plenty of experience, because in assessing labour performance you are dealing with something that varies from hour to hour, even minute by minute, something that can be affected by the weather or the previous night's libations. A straight measurement of the time taken for any operation is useless—let me show you why by means of an illustration:—A man placing twenty identical cans into a container under identical conditions can take anything from say 10 seconds to 10 minutes. The difference in speed is caused by three things:—

1. Variation in method from the perfect to the ridiculous
2. Impact of actual *lost* time, e.g. in being completely idle, discussing last night's ball game with his neighbour

3. Variations in the effort with which he performs the task.

To ensure a correct standard the rate setter must make sure the correct method is being used, to eliminate factor 1; he must remove all lost time from his calculations, to eliminate factor 2. Even then the observed times may vary from 10 seconds to 30 seconds due to factor 3. He must, therefore, be qualified to *rate* the performer so as to reduce or increase the observed times to those which would obtain if the performer were working at a standard rate of speed and effort. This can only be done by a properly trained observer. But when you realize that the correct time was probably 15 seconds you can assess the potential economies from this area.

Eliminate Excessive Indirect Workers

The second part of our labour cost consideration is directed towards minimum expenditure on indirect operators per unit of production. If we are to achieve economic manufacture we must first reduce the "red spots" to the essential minimum and then study the remainder for mechanization. Why, for example, need we carry material between operations? Is it not possible to place the relevant machines in sequence so that the work-in-progress can pass from one machine to the next by means of conveyors, chutes, or even transfer tables? That line of attack, moreover, leads to much more than the elimination of *carrying-labour* between operations—it leads to the many other advantages associated with what I like to call physical control of movement.

This is so important a principle that I think it is of advantage to consider it in some detail. To do so, it is necessary to determine why uncontrolled physical movement incurs additional and unnecessary expenditures. In manufacturing plants which are laid out departmentally on a functional basis and which handle a variety of products—the movement of work-in-progress between processes is *not* controlled physically. It can be arrested and disturbed for a number of reasons, for example:—

(a) Lack of balance in department, machine or plant rate of production, particularly if those under-loaded are allowed to run at maximum rate.

(b) Movement of work to a wrong department; no one wants to spare the time to move it back again.

(c) Preference by the foreman or chargehand for one type of work because it boosts production figures.

(d) Preference by the operator for "easy" work which increases his piece-work earnings.

(e) Side-tracking faulty work until pressure is brought to bear to rectify it.

Those are but a few examples and the list can be extended very considerably. The main point I want to establish is that absence of

physical control of movement can, and will, produce the conditions which lead to a pile-up of work between operations and a failure to keep to a programmed movement. Thus, in addition to the cost of carrying between operations, the additional indirect operations are incurred as I have indicated—the need for a clerical control of movement, with its record clerks and messengers, the need for progress chasers or trouble-shooters, the need for intermediate stores and storekeepers.

Now let us take an example of physically controlled flow—the same machines and operations but segregated and placed adjacent to each other and in operational sequence. There is only one place to which the relevant material can go and immediately there is cut out the need for clerical control at this point—the material can be delivered directly to racks sited by the first operation machine. From there the material flows from operation to operation, the transfer being automatically effected by the next operator's need for work. By siting the machine sequence so that it strikes the assembly line at the correct point, the necessity of an intermediate component stores disappears—all that is required is to ensure that raw material is fed to the machine line at a rate which the assembly can absorb.

The difference between physically controlled and uncontrolled movement is simply this; in physical controlled movement the work-in-progress can go nowhere else but to the next operation—by reason of the automatic transfer between machines correctly sited, or of the physical control of conveyors or chutes. In uncontrolled movement it can go anyplace, or nowhere at all.

Pros and Cons of Physically Controlled Work Flow

There are, of course, financial disadvantages which must be taken into account and which may not always make the introduction of full physical control of movement a paying proposition. For example, the revised layout will lead to additional costs to the extent to which you have to provide additional machine capacity elsewhere, as the result of poor utilization in the line production. Of course, if a particular machine or plant is only used anyway for the component or product, the processed layout of which you are considering, then the fact that it *is* poorly utilized is not a financial disadvantage of the physically controlled line production. But if the inclusion of the machine in the line—and thus restriction of its use to a particular component or product—means a further machine purchase to meet the other demands upon it, then the interest on the additional capital outlay and the depreciation in value on the basis of possible obsolescence (but not wear and tear) must be taken into account in assessing the economics of the move. There is, however, an offsetting economy which is important. I refer to the reduction in "setting" costs. By restricting the machine to the one component or product, the elimination of the break-

down and setting-up costs may mean substantial savings which will go a long way towards meeting the cost of purchasing the further machinery.

Once again, therefore, it becomes necessary to weigh the financial "pros" and "cons". On the credit side we have:—

1. Release of locked-up capital represented by excess work-in-progress. Without physical control, the build-up of work-in-progress can reach figures which make serious inroads on the cash position.
2. The elimination of manual handling of work between processes and operations. Shop labour is substantially reduced thereby.
3. Reduction in the number of progress chasers, recording clerks, intermediate storekeepers and other indirect labour. All that needs to be covered is the movement of material to the beginning of the line and checking output at the end.
4. Reduction in excess direct labour costs. The excesses principally affected are those relative to waiting for work, overtime premiums, and make-up, all of which are reduced as the result of the steady flow of work to each operation or machine.
5. Reduction in the amount of paper-work necessary to move material through the plant.
6. Reduction in loss through scrap or faulty work. When work-in-progress is allowed to pile up between operations, there is a corresponding delay in stopping incorrect work—for example, a machine can go on churning out components with dimensions outside the accepted limits to the extent of the build-up of work-in-progress before the next operation or inspection.
7. Improvement in operator productivity resulting from the smoother flow of work and the psychological effect of having to feed consistently the operator next in line.
8. Improvement in supervision, since there is a smaller area to cover and less work-in-progress to control.
9. Reduction in risk of obsolescence. With a minimum of work-in-progress between operations, the cost of scrapping out a particular component is clearly reduced to a minimum.
10. Reduction in burden of floor space costs—heating, lighting, cleaning, and so on—and of other "fixed" overheads through increased production yielded by the freed floor space.

Against these there must be considered on the debit side:—

(a) Amortization costs of any mechanical handling plant, etc.
(b) Amortization costs of any additional machinery, less economics in setting costs.
(c) Amortization costs of altering the existing layout.

In calculating these amortization costs, due regard has to be given to the term of permanency of the product being considered. It is only necessary, however, to take into account the probable life of the production in its present *general* form; minor changes in design can be ignored because they are not likely to affect the sequence of operations and, therefore, the layout, and the main costs will be incurred as a result of the accompanying tool changes.

Non-Financial Advantages of Physically Controlled Work Flow

Before leaving the question of this Profit and Loss account, may I stress the importance of taking the non-financial advantages into consideration before arriving at a decision. A major one is the reduction in overall manufacturing time. Quicker deliveries can be quoted and delivery promises can be kept because the passage of work through the plant is not only accelerated, it is also definite. In a functionally departmentalized factory where uncontrolled movement is general, it is quite normal for actual processing time to be less than 20% of the overall manufacturing time. If complete physical control were possible in such cases, the overall manufacturing time could be reduced to as little as one-fifth.

The result of the Profit and Loss account must, of course, be the main consideration in arriving at a decision. It is important to remember, however, that the possibility of using physical control of movement is not limited to a whole factory or a complete product. It may not be possible or advantageous from a cost angle to achieve full physical control throughout the factory; rarely will it be the case that some part of production cannot be physically controlled. The principle can, in fact, be applied to one or two products in a multi-product factory; it can be applied to one or two departments; it can be applied to a few sections of the total production sequence of a product; it can even be applied to a few machines. Too many times the comment is heard "Mechanization or flow production or line production only applies to mass production—not to our type of product". I believe that it can be introduced in part, if not wholly, in any plant or factory engaged in the manufacture of a definite product. I would go further and say that even in the case of "jobbing" or general engineering works, occasions will arise when its adoption will pay dividends.

Minimizing Indirect Production Costs

Let me now summarize the means whereby indirect costs of production can be reduced to a minimum.

1. The introduction of physically controlled flow of work-in-progress. Where it is not possible to site machines or plant immediately adjacent, the same conditions can be obtained by linking them by a conveyor system.

2. Where physical control of flow is not possible, the establishment of a simple but effective planning and progressing scheme, the main objective of which is to keep work on the move and work-in-progress to a minimum.
3. The use of mechanical means of transport. Where this is required, fork trucks and palletized loads can do much to reduce handling costs.
4. Establishing standards of output for the unavoidable indirects. The technique of time and motion study can be applied successfully to most indirect operations, and in the other cases expenditure budgets can be established with a fair degree of accuracy as the result of on-the-spot studies.

Sales and Design in Cost Reduction

The next significant area for cost reduction with which I want to deal is related to the effect of sales and design policy on production costs. It is felt mainly in two ways:—

(1) Degree of variation in quantitative demand and, therefore, loading of the plant and

(2) Degree of variety in the products made.

Clearly the ideal form from an economic point of view is a steady production of as few types as possible. The nearer one gets to this ideal, the more likely the principles of physically controlled flow, with all its economics, can be applied. But in addition to this factor we know that:—

(a) A steady loading means lower production costs, lower work-in-progress, lower training costs, better operator productivity.

(b) The minimum variety of product yields higher production quantities, better balancing of loading on plant and machinery, lower stores costs, less work-in-progress, reduced overheads, particularly in clerical work and progress-chasing.

The achievement of these aims rests very much on the combined efforts of the sales and design staff. Between them, they must achieve the maximum standardization of product so far as it affects the plant —variety wants to be limited to external appearance and not internal mechanisms. While it may not be desirable to achieve the degree of standardization of product indicated by Henry Ford—"You may choose any colour providing it is black"—at the same time we can go much further than at present in standardizing components and assemblies. The principle has been applied in clock manufacture where the same mechanism is put into a variety of shapes and colours of cases, so giving the factory a standard product to make and the customer the opportunity of a wide choice.

As regards steady loading, a good sales force can sell what the factory makes and at the rate it makes it, providing output is correctly

related to the potential market. In this respect I am reminded of that series of advertisements which reads "Not too much—not too little—but just right". If the rate is unnecessarily low, production costs will be correspondingly high and the market difficult to hold in competition. If the rate is too high, over-production will produce serious reductions in programme and violent fluctuations in factory loading with all its costly disadvantages. In the endeavour to assess the "just right" a well-conceived market research is essential—not only in selling direct to the consumer but often also in contract selling.

Even when production rate is appropriately matched to the potential market, the week-to-week sales may be subject to seasonal fluctuation. Here again, it is necessary to consider financial "pros" and "cons" in order to judge to what extent it will pay to increase inventory during the slack period in order to maintain steady factory loading—the cost of the increased stock in space, handling and other charges, as well as of the locked-up capital, being set against the relevant economics in production costs.

Management Organization and Control Techniques

There is a further significant area which I must touch upon because it plays such an important part in the battle for minimum total costs. I refer to the management organization structure. The basis of all operating can be briefly stated. It is to set appropriate objectives, to plan to achieve these objectives, and then to watch for any deviation from plan so that corrective measures can be taken. The size of the organization structure is determined by the load on top management, and this load again is the measure of the amount of co-ordination which is required for the members of the management team, the appropriateness of the objective and the subsequent operating plans (because bad objectives and bad plans mean a great deal of additional effort and consultation before matters can be righted) and finally the effectiveness of the control media used by management (because with adequate media less questions have to be asked and with minimum delay in their presentation less effort is required for corrective action). All these things can be facilitated by good reporting, so that it can be said that effective controls and reports play an essential part in reducing the cost of management. More will be said in detail concerning the form and make-up of these control media, but looking at the matter from the cost reduction angle I would urge the attention of all accountants to the following essentials for good reporting—whether descriptive or in the form of control figures.

1. Reports, especially those covering performance against plan, must reflect as accurately as possible a true picture of the situation. It is no good, for example, a profit position being shown as satisfactory if it contains a substantial credit for which no budget was made. The credit is merely offsetting

a substantial failure to meet the plan; the fault is still there and the omission to reveal it is fooling management.

2. Reports must be submitted as soon as possible following the end of the period to which they refer. This is so important that accuracy should be sacrificed to speed providing the report still reflects a true picture. Any manager worth his salt will blow his top if a week's delay in taking action to stop a $1,000.00 loss in scrap is caused by the accountant insisting on waiting for a $10.00 item to complete his account.
3. Reports must be clear, concise and in language understood by the recipient. One of the outcomes of the last requirement is that there should be verbal explanations of variations from plan indicated by figures. If a manager has to spend time finding out what a report means, that is not a good report.

May I re-assert my firm belief that the most effective role of the accountant in industry and commerce is that of an interpreter. Control media for the greater part must be in terms of dollars and cents in order to use a common denomination; the final answers presented to top management do not always reveal the implications of the many items which go into the final answer; it is the accountant's responsibility to take note of them so that he can interpret correctly the story the final figures present.

FOR FURTHER READING

COST REDUCTION, by L. A. Stock, Cost and Management, July-Aug. 1956.

A COST REDUCTION PROGRAMME, by Pierre W. Hogle, A.M.A. Manuf. Series No. 209.

COST REDUCTION AND CONTROL, by Gerald G. Fisch, Cost and Management, July-Aug. 1955.

COST REDUCTION IN ACTION, by W. L. Snyder, Cost and Management, June 1955.

ACCOUNTANT REQUIRED

For immediate duties of General Accountant in small industry of large corporation. Preference given to R.I.A. graduate or student member of S.I.C.A., about 25 years of age. Salary and profit-sharing commensurate with experience.

Please reply to:

Cost and Management
Box 58
31 Walnut Street South, Hamilton, Ontario

Integrated Data Processing. . .*

By H. S. BROWN,
Assistant to Sales Manager,
R. L. Crain Limited,
Ottawa, Ontario

What is the fundamental purpose of Integrated Data Processing? What are its advantages? What analyses are required before it can be applied? Can it be applied equally as well to small and medium sized companies as to large companies? In the following article, the author clears up these questions and offers helpful information on a subject which has been a mystery to many.

RECENTLY a visitor arrived at our home office for the purpose, among other things, of discussing I.D.P. I committed a common error in assuming he was fairly well versed in the subject until he asked the question, "Well, what is I.D.P.?" Probably the vast majority of you have been exposed to this terminology, but so that we all progress on common ground a little review may be in order.

Some would no doubt like to hear it said that I.D.P. is a concept of paperwork simplification we've been practicing for years, through the adoption of one-time carbon duplicating methods, etc. To a degree this statement may be correct, but this is not the area I wish to explore here. The terminology has only been "on the market" for two and a half years. It grew out of the AMA Convention in New York (Feb. '54) and was specifically applied to the perpetuation of data through the use of a common language medium (punched paper tape) connecting compatible units of business equipment. Common usage has, therefore, centered this relatively new language around processes associated with related equipment.

Certain principles have been established, and briefly, we may define I.D.P. as relating at the time a document is originally written to the automatic creation of a by-product medium to activate other equipment. Repetitive writing will thus be eliminated.

Now that we've very simply defined the subject before us, I would like to suggest we proceed, giving consideration under the following headings:

1. I.D.P. equipment.
2. Its place in relation to large business.
3. Its place in relation to small business.
4. How can I.D.P. be approached?
5. Why you should be interested in the I.D.P. concept to-day.

Equipment

The need existed for the bringing together of mechanical operations by an automatic process. To progress a document from one phase of operation to the next required the repetitive writing of data either

*An address delivered at the 35th Cost and Management Conference of the Society of Industrial and Cost Accountants of Canada, in June 1956 at Mont Tremblant, Quebec.

by hand or on key-driven units of equipment. Someone had the vision to suggest the production of a medium for the first unit of equipment that would activate the second unit—or a punched paper tape. And now in the equipment field over the past few years units of equipment have been developed to handle almost every phase of paperwork routine in existence. Electric typewriters are now produced that will read this punched paper tape medium and produce by-product tapes containing either all the information entered on the hard copy or selected pieces of data as required. The by-product tape can be used to re-activate the same machine or other machines of different manufactures. For example, the next phase in a systems operation may be the transmission of data over a teletype circuit. The by-product tape will do the job without a key-driven action being necessitated. Or maybe punched cards are needed; then the selective tape will activate a tape-to-card machine for the production of punched cards. Addressograph plates can be embossed, all from this one medium. I feel safe in remarking that if you can think of any office machine you would like to see automatically energized, the office equipment folk are in a position to accommodate you—adding machines producing punched tapes, and punched tapes running adding machines—calculators built in and associated with typewriters—there is almost no end to what can be done.

You may note that so far I have avoided reference to the number of channels in a tape. Let's remember that the tape is only a means to an end. Whether the equipment you are interested in makes use of a five, six, seven or eight channel medium is secondary to the consideration—"Will it do the job for which it is specified?" Much of the equipment involved in I.D.P. systems has been tied to the five channel medium for the simple reason the system is involved in wire transmission which, of course, uses the five channel medium.

Much may be said for the effectiveness of the seven and eight channel mediums and the ability for parity checking that exists. Yet the communications engineers are not asleep at the switch. I'm certain that sometime in the future a means of parity check will evolve in conjunction with a five channel medium.

There is no doubt that the tremendous interest evidenced in I.D.P. is having an effect on communications equipment. Surveys made forecast a definite upswing in this method of communication and I believe that the teletype equipment suppliers will be asked to produce varied and wonderful results from their equipment. Already they are doing just this.

Before leaving our discussions on equipment, let me leave a thought with you. This whole office equipment field is unfolding in a completely evolutionary fashion at amazing speed. New models are being introduced almost before their predecessors hit the market. In

my opinion, with to-day's engineering skill, this trend will continue for some time. A levelling-off will not be experienced until you, the customer, have been satisfied—for it is your demands that are sparking the engineers in the continuing development of equipment to satisfy to-day's paperwork needs. Let me illustrate this evolutionary process.

A typewriter was built to read and punch these paper tapes. Filing became a problem, so someone somewhere said they preferred to file cards. The edge punched card was born, and we now have a card about the size of the conventional tabulating card that contains punched holes like that in the paper tape that will activate the typewriter. Customer demand reached a little further and in the U.S. now a teletype unit has been developed that will read the edge punched card.

Another illustration: The typewriter that reads the punched paper tape obtains all of its instructions from the coded data in that tape. Somewhere a customer became concerned. He was having difficulties. Should he set up all his master tapes containing repetitive data with the many detailed programming instructions contained therein? His future plans involved the input of data to a computor. The programming instructions were likely to change and quite frankly the duplication of his tape with changes would constitute a major undertaking. So he had the equipment people provide a machine with two readers—one for the standard repetitive data and the other for his programme tape. If the computor folk changed programme instructions he could follow suit in a matter of minutes rather than days or weeks.

I understand too that developments are underway with one teletype organization in the U.S. whereby ultimately data may be transmitted on multi-code equipment and terminate on magnetic tape for input into electronic computors (not restricted to five channels).

Enough has probably been said here to suggest that as always it is customer demand that spurs development.

The Place of I.D.P. in Relation to Large Business

In relation to large business, it is not too difficult to broadly assess the place of I.D.P. Picture a national organization with a centrally located control unit, well equipped with the latest in electronic data processing systems. Once data has been converted to magnetic tape or punched card medium as required, tremendous feats of engineering will accomplish analysis and reports of every known variety in literally minutes of time.

But what has been gained if it took two weeks to process an order up to the point of input for the E.D.P. system. Here is the area that needs attention. So often the processes supplying data to these centrally located administrative units have become clogged through the breakdown of a system called upon to handle volume and conditions for which it was never designed. One visitor to our I.D.P. workshop

stated at the end of our discussions that he felt the committee, of which he was a member, had been devoting too much attention to one phase of the overall system—the computor phase. He suggested that more concentration was needed by their group in the refining and speeding up of the input of information prior to the computor stage.

Much can be done by large organizations in the elimination of repetitive clerical operations. Let me illustrate the approach of one Canadian organization. As orders are received in the sales office structure, they are passed to a teletype unit for transmission to the plant. A customer's master tape is selected from file and inserted in an "off-line" machine. When variable data (such as customer's order number, date, product description, etc.) are to be entered the machine stops on the instructions of the master tape, not the operator. The operator types in the variable. The machine picks up automatically and types the remainder of the data. As this operation proceeds, a complete by-product tape is produced and contains *all* the data on the order. The hard copy is checked for accuracy. (Only the variable data needs detailed checking.) The by-product tape is then used to transmit the order to the plant. Thus we achieve maximum efficiency when "on-line" in both speed and accuracy. I don't need to pursue the effect that incorrect data has on production.

Now we're at the receiving end. Simultaneous to the sending operation, a set of forms containing all data necessary for production has been printed. Now the order is in production within a minimum space of time from the moment it was entered in the field office. Another medium has been created—a punched paper tape that will facilitate the writing of an invoice and even activate a tape-to-punched card converter, thereby automatically providing the means for punched card accounting or analysis. And there are many by-roads that could be travelled. I've merely stayed in the middle in my brief illustration. The advantage in accuracy, speed, and in the reduction in operators are apparent.

I.D.P.'s Place in Relation to a Small Company

I've often had it said to me "IDP is o.k. for the larger corporation, but we're too small to consider such processes as these." Let me cite the case of an American organization employing a total of 50 staff. This company is a supplier of laboratory apparatus and supplies. They have some 4,000 established accounts and about 40,000 items in their line, approximately half of which are stocked. Here's a brief run down on their I.D.P. system:

There are three basic phases to their operation:

1. The Account Control.
2. Order Entry and Invoicing.
3. Accounts Receivable and Tabulating Reports.

Account Control—

When an order is received from a new customer a handwritten form provides details, including customer number, to one of these tape reading and tape punching typewriters. A copy of the handwritten data is typed on the machine producing, at the same time, a by-product eight channel tape which is the permanent customer tape. Various parts of the printed form provide the indexing requirements for alphabetical and numerical accounting records, including credit data. One copy is produced on gummed stock and glued to the face of a Wheeldex card form, and is used for holding the customer tape.

Order Entry—

Once an account is established all orders follow the same procedure. An incoming order is edited and necessary detail added to a gummed apron applied to the customer's purchase order. The customer's tape accompanies this document and together they go to the typing section. The tape reading and tape punching typewriter is equipped with two punches. This tape is inserted in the machine and all repetitive information is automatically written on the combination invoice - shipping order form. Instructions in the coded tape tell punches one and two when to record data that is being typed. If an order calls for a back-ordered item, punch two is turned on and a by-product tape provides the medium for writing on the back-order form. The number one tape is filed in the folder pocket which holds the invoice and accounting file copy until shipment has been made. When notice of shipment is received the invoice set is placed in a biller to print extensions. After mailing of the invoice the number one tape is attached to the accounting copy and passed back to the tape-reading typewriter and here we get into the third phase.

Accounts Receivable—

This short tape contains only invoice number and territorial code. It is inserted in the machine and there is added the extension data that the biller put on the invoice. Two tapes are a by-product of a listing produced on the typewriter—one of which is in rolled form and goes to the tabulating machine service bureau. The other is filed with the accounting copy.

The first roll of tape is used by the service bureau to activate tape-to-card equipment, thus providing the medium for sales analyses in their many forms.

The other tape is used to prepare the deposit slip when a cheque is received from the customer.

Only a few points have been highlighted in the system for which two tape reading typewriters were installed. Obviously these two typewriters play an important roll in the system. Scheduling of machine time is important. So as to get the most out of the equipment, this

company uses a second shift operation writing sales promotion letters automatically from tape. Their addressograph plates for envelope addressing are prepared from tape on an automatic graphotype.

Also, on this second shift operation, the company's sales catalogue is automatically prepared from edge punched cards.

This illustration shows the potential of I.D.P. in a small company. Within this company's walls there is involved only the two typewriters. By-product tapes operate other equipment in service bureaus at a considerable saving in time and money.

How Can I.D.P. Be Approached?

Let's first establish that the I.D.P. concept is merely another tool of paperwork simplification. That being the case, there is only one approach—the work simplification approach. The organized application of common sense by everyone to eliminate waste,—waste of time, energy, materials, space, equipment—waste of any kind.

Possibly you have seen it happen. Someone will order the equipment and then figure out what they want to do with it. Why not start at the other end? There are three major areas of paperwork where economies and improvements may be developed.

One is the Forms Design.

Two is in the Writing Method.

Three is in the Procedure.

As a rule of thumb, for every $10 spent in forms cost, $1,000 is involved in the cost of overall operations—the procedure. So let's start where the potential savings are greatest and once the problem has been defined and the particular system or procedure chosen for improvement, follow these simple rules:

Get the facts concerning the present operation—all the facts, every piece of paper. What causes its origin, and what purpose does it serve? Further, get these facts from the person performing the job.

Organize these facts in flow-chart form and apply the work simplification formula in order to *develop improvements.*

WHAT is done?	W	is it done?	—ELIMINATE
WHERE is it done?	H	is it done there?	COMBINE
WHEN is it done?	Y	is it done then?	CHANGE
WHO does it?		does this person do it?	SEQUENCE
HOW is it done?		is it done that way?	—SIMPLIFY

Once you have decided *WHAT* you want to do then it's time to consider the types of equipment capable of accommodating your needs. Much literature is available and the equipment manufacturers are only too pleased to let you know what their equipment will do. Then you are ready to—

Obtain agreement—and I don't mean just the agreement at executive level. Remember the clerk on the line is not a machine. He needs

to understand where he fits into the new programme. He must know that the new simplified devices are there as a tool of the organization and will work to his benefit.

Finally, *apply the improved method.* Thorough education is essential on the part of all persons involved in the installation of a new system. Each one is a spoke in the wheel and without full support the overall structure can be weakened and the new system gets off to a horrible start.

Experience has pointed out to us on more than one occasion that the appointment of one person to follow through, and co-ordinate such a programme is a must. His terms of reference should allow him to cross inter-departmental lines in both the study and improvement phase of developments. Also, when outside views are obtained, it is essential that this one point of contact be maintained for the proper interchange of ideas that are always acceptable.

Why Should You Be Interested in This I.D.P. Concept To-day?

It is unnecessary to dwell on the trend towards increased clerical costs. You are aware of that condition. Recently I was talking with the Comptroller of a large corporation involving several subsidiary companies. He stated that practical automation in the production end of their operation had advanced to the point where, speaking broadly, they had milked dry the potential for further economies. And yet they were faced both within and without this country with increased keen competitive situations. Price increases are out of the question. Costs must be reduced in order to hold the market. He concluded there was one area of attack—that of the paperwork function and he intended sparing no effort in getting the most out of his administrative dollar.

This comptroller's views are shared to-day by many top executives. If the I.D.P. concept can eliminate repetitive operations, speed the flow of data, provide better customer service, reduce business cycles and thus affect inventories—then it is a concept that the prudent manager cannot afford to overlook.

PERSONALS

B. H. Breckenridge, R.I.A., a member of the Hamilton Chapter, has been appointed Assistant General Manager and Secretary of Varian Associates of Canada Ltd., Georgetown, Ontario. Mr. Breckenridge was formerly Business Manager and Assistant Secretary-Treasurer.

Peter Clarkson, a student member of the Montreal Chapter, has been appointed manager of the Canadian Chemical & Cellulose Company, Ltd. plant at St. Johns, Quebec. Mr. Clarkson was formerly assistant plant manager with Belding-Corticelli Company Limited, St. Johns.

Student Section . . .

Comments by Mr. C. C. Gourlay.

EXAMINATIONS, 1956
ACCOUNTING I.

QUESTION I (15 marks)

The Accountant of the Consolidated Grocery Company was preparing a bank reconciliation. The bank balance according to the general ledger was $734.50, and after the accountant had made allowances for the following information as at the 30th of June, 1955, the ledger and bank balances were in agreement:—

(a) The bank had collected a draft for the company. The face of the draft was $225.00 but the bank charged a collection fee of $3.00. The collection of this draft had not been recorded on the books of the company.

(b) The following cheques had not been presented to the bank:

#71 — $127.40
#82 — 69.25
#90 — 36.75

(c) The bank returned a cheque, drawn by Mr. Fred James for $73.40, marked N.S.F. This cheque had been received in payment of a note given by James to the company.

(d) Among the cheques honoured by the bank was one that the Consolidated Grocery Company had issued for $169.40 to the Zelra Biscuit Company. This cheque had been recorded in the company's cheque book as $196.40.

(e) The bank deposit dated June 30, 1955, amounting to $137.70, had not been recorded by the bank.

(f) Bank charges amounting to $3.75 had not been recorded in the cash book.

(g) A cheque for $92.20 had been charged to the Consolidated Grocery Company by the bank in error.

REQUIRED:

(a) Prepare the bank reconciliation as at 30th of June, 1955.

(b) Give the necessary general journal entries to correct the cash account.

SOLUTION TO QUESTION I

Consolidated Grocery Company
Bank Reconciliation Statement.
June 30, 1955.

Balance—General Ledger			$734.50
Add			
Draft collected by bank	$225.00		
Less collection charge	3.00		
		$222.00	
Error in recording cheque to Zelra		27.00	
			249.00
			983.50

Deduct			
Bank interest and expense	$ 3.75		
N.S.F. cheque—F. James	73.40		
			77.15
Corrected balance			906.35
Balance—Bank Statement			909.85
Deduct			
Outstanding cheques—#71..	$127.40		
82..	69.25		
90..	36.75		
			233.40
Add			676.45
Bank deposit not recorded		137.70	
Error of cheque charged to Consolidated Grocery	92.20		
			229.90
Corrected Balance			906.35

June 30	Cash		
	Notes Rec.	225.00	
	Bank collected draft		225.00
	Bank charges	3.00	
	Cash		3.00
	Bank charged $3.00 to collect draft		
	OR		
	Cash	222.00	
	Bank Charges	3.00	
	Notes Rec.		225.00
	Bank collected draft of $225. but charged $3.00 collection charge.		
June 30	Fred James	73.40	
	Cash		73.40
	Cheque given us by Fred James returned N.S.F.		
June 30	Cash	27.00	
	Zelra Biscuit Co.		27.00
	To correct error in cheque book with respect to the cheque given to Zelra.		
June 30	Bank charges	3.75	
	Cash		3.75
	To record Bank Charges.		

QUESTION I

The question was quite well handled. Too many students were confused because the bank balance figure was not given and too many students proved the bank balance rather than do a bank reconciliation. Many students were careless in handling the necessary journal entries to correct the ledger.